



Forecast Fundamentals:

Surf Observations

Elements of Surf Observations

"The safety and success of amphibious landings is largely dependent upon *known surf conditions.*"

Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT _____

Significant breaker = avg of highest 1/3 to nearest 1/2 foot.

BRAVO PT _____

Max breaker = nearest 1/2 foot

CHARLIE 7 PT 5 _____

Breaker period = nearest 5/10 of a second

DELTA PLUNGING SPILLING SURGING

breaker type = percentage applicable

ECHO TOWARD FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT PT KT TOWARD FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF TO LINE IN FT

Surf Zone. Predominant number of breakers in , and width of.

HOTEL _____

Pertinent remarks = Wind, weather, visibility, secondary wave systems, etc.

WAVE HEIGHT COMPUTATIONS

FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

____ X _____ = _____
 _____ X _____ = _____

TOTAL = _____ = _____ ALFA

Wave Height Observations				
Time Began:				
P=Plunging S=Spilling X=Surging				
1	21	41	61	81
2	22	42	62	82
3	23	43	63	83
4	24	44	64	84
5	25	45	65	85
6	26	46	66	86
7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	5	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100
Time Ended:				
Wave Period Computation:				
Elapsed Time XXMIN XXSEC				
Total Seconds =xx/100=CHARLIE				

Elements of Surf Observations: The “Big Picture”

“Most measurements made *relative* to the beach from the *ocean’s* perspective”

N

Accurate surf observations
cord pertinent surf features
and relevant METOC features

Breaker Angle

1. The acute angle, in degrees that a breaker makes with the beach and its direction relative to the beach.
2. Breakers striking the shore at an angle produces a littoral current which can reach speeds of 3 - 4 kts for high waves of great angle.

Visibility:

Onshore

unrestricted

Offshore 3 mi

fog

30° Right
Flank
Breakers

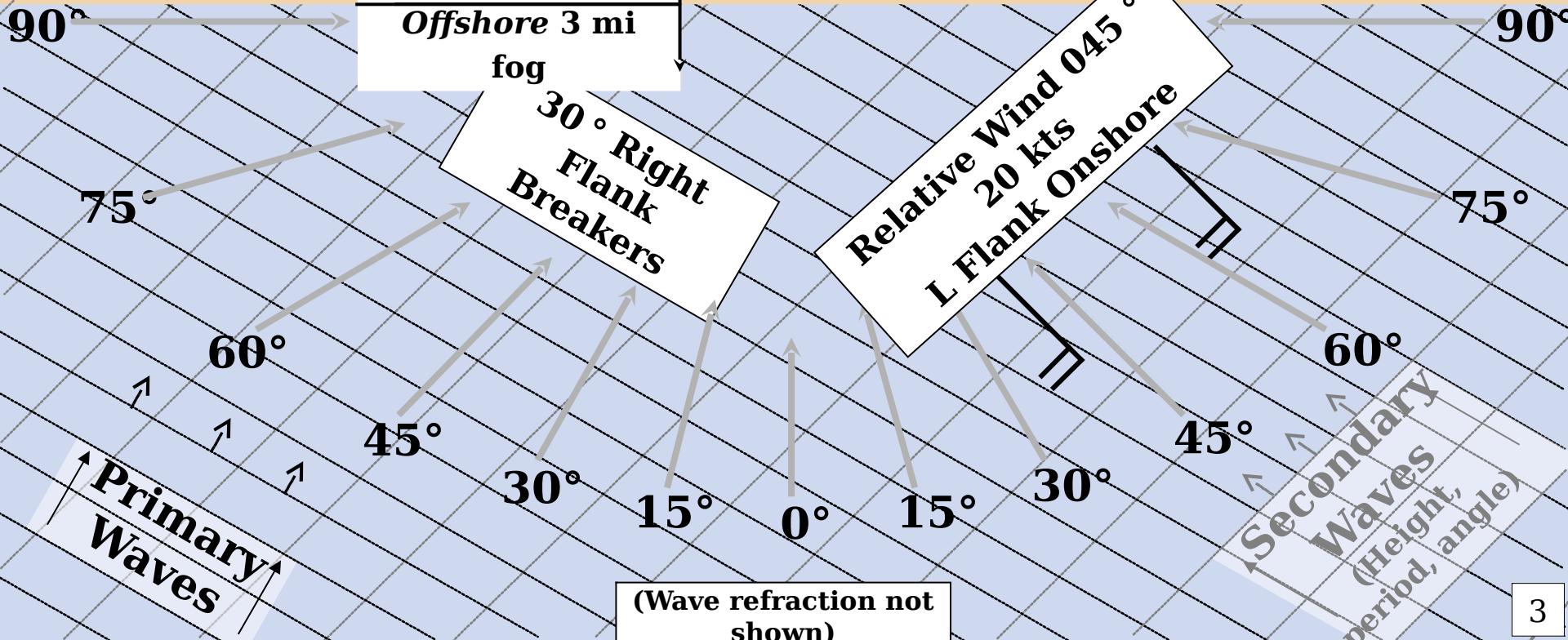
Angled breakers increase the chance
of a landing craft breaching.

Observer

Thunderstorm
10 miles Southeast
(Distant features
measured
from *true north*)

LEFT FLANK

RIGHT FLANK



Wave Height Observation

Wave Height Observations				
Time Began:				
P=Plunging S=Spilling X=Surging				
1	3.5 S	21	41	61
2		22	42	62
3		23	43	63
4		24	44	64
5		25	45	65
6		26	46	66
7		27	47	67
8		28	48	68
9		29	49	69
10		30	50	70
11		31	51	71
12		32	52	72
13		33	53	73
14		34	54	74
15		5	55	75
16		36	56	76
17		37	57	77
18		38	58	78
19		39	59	79
20		40	60	80
Time Ended:				
Wave Period Computation:				
Elapsed Time XXMIN XXSEC				
Total Seconds =xx/100=CHARLIE				

- A form similar to that on the left is required to take an accurate surf observation.
- The process begins by observing 100 successive breakers, recording the height and type of each breaker.**
- Heights are recorded to the nearest half-foot. "3.5 ft spilling" encoded as "3.5 S"
- Additionally, the total time for the observations is recorded.
- An example completed form is shown on page 12.

** Note: under actual combat conditions, 50 breakers are counted.

Surf Observation Report
SUROB NO _____
BEACH _____
DATE/TIME _____

(A) { **ALFA_4_PT_0**

Significant breaker = avg of highest 1/3 to nearest 1/2 foot

(B) { **BRAVO_5_PT_5**

Max breaker = nearest 1/2 foot

CHARLIE ____ PT ____

Breaker period = nearest 5/10 of a second

DELTA __ PLUNGING __ SPILLING __ SURGING

breaker type = percentage applicable

ECHO ____ TOWARD ____ FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT ____ PT ____ KT TOWARD ____ FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF ____ TO ____ LINE IN ____ FT

Surf Zone. Predominant number of breakers in , and width of

HOTEL _____

Pertinent remarks = Wind, weather, visibility, secondary wave systems, etc.

WAVE HEIGHT COMPUTATIONS FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

5.5 X 1 = 5.5

5.0 X 4 = 20.0

4.5 X 9 = 40.5

4.0 X 15 = 60.0

3.5 X 4 = 14.0

TOTAL = 140 = 4.24 = ALFA
33

Sig. Max Breaker Height

A. The highest 1/3 of the observed breakers are recorded, then averaged (see bottom left).

1	4.0S	21	2.5S	41	3.0S	61	4.0S	81	2.5S
2	4.5S	22	4.0S	42	3.0S	62	3.0S	82	2.5S
3	3.5S	23	4.0S	43	4.5S	63	3.5S	83	3.5S
4	3.5S	24	3.5S	44	2.5S	64	4.0S	84	3.5S
5	4.0S	25	2.0S	45	2.5S	65	3.5S	85	4.0S
6	3.5S	26	1.0S	46	1.0S	66	2.5S	86	1.0S
7	3.0S	27	1.5S	47	4.5S	67	2.5S	87	2.5S
8	3.5S	28	3.0S	48	1.5S	68	1.0S	88	4.0S
9	3.0S	29	2.5S	49	1.5S	69	1.0S	89	1.5S

(Example lower left: 4 foot breakers)

B. The maximum breaker is the **highest** breaker noted in the observed set. This is reported as element BRAVO, also recorded to the nearest 1/2 foot. (Example at left: max breakers 5.5 ft)

Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT _____

Significant breaker = avg of highest 1/3 to nearest 1/2 foot.

BRAVO PT _____

Max breaker = nearest 1/2 foot

(C) CHARLIE 7 PT 5
Breaker period = nearest 5/10 of a second

DELTA PLUNGING SPILLING SURGING

breaker type = percentage applicable

ECHO TOWARD FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT PT KT TOWARD FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF TO LINE IN FT

Surf Zone. Predominant number of breakers in , and width of
HOTEL _____

Pertinent remarks = Wind, weather, visibility, secondary
wave systems, etc.

WAVE HEIGHT COMPUTATIONS

FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

X _____ = _____
X _____ = _____
X _____ = _____
X _____ = _____
X _____ = _____

TOTAL = _____ = ALFA
33

Breaker period

C. Add the total time for 100 obs
and divide by 33 (combat
conditions, total time for 50
obs divided by 16). This is the
breaker (wave) period.

Wave Height Observations									
Time Began: 10 min 10 sec									
P=Plunging S=Spilling X=Surging									
1	40S	21	2.5S	41	3.0S	61	40S	81	2.5S
2	45S	22	4.0S	42	3.0S	62	3.0S	82	2.5S

19	3.5S	39	1.5S	59	4.0S	79	2.0P	99	4.5S
20	4.0S	40	1.5S	60	4.0S	80	2.5S	100	2.0S
Time Ended:	22 min		15 sec						
Wave Period Computation:									
Elapsed time:	12 min		05 sec						
Total seconds = 725/100 = 7.25 = Charlie									

- Breaker period is measured to the nearest 1/2 second and is reported as element CHARLIE.

(Example : breaker period 7.5 sec)

Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT

Significant breaker = avg of highest 1/3

BRAVO PT

Max breaker = nearest 1/2 foot

CHARLIE PT

Breaker period = nearest 5/10 of a second

68	1.0	88	40
69	1.0	89	45
70	1.0	90	40
71	2.5	91	35
72	2.5	92	35
73	3.0	93	1.0
74	2.5	94	3.5
75	2.0	95	45

(D) {DELTA_10_PLUNGING_90_SPILLING_0_SURGING}
breaker type = percentage applicable

(E) {ECHO_30_TOWARD_R_FLANK}
Breaker angle = acute angle that breaker makes with beach.

FOXTROT PT KT TOWARD FLANK

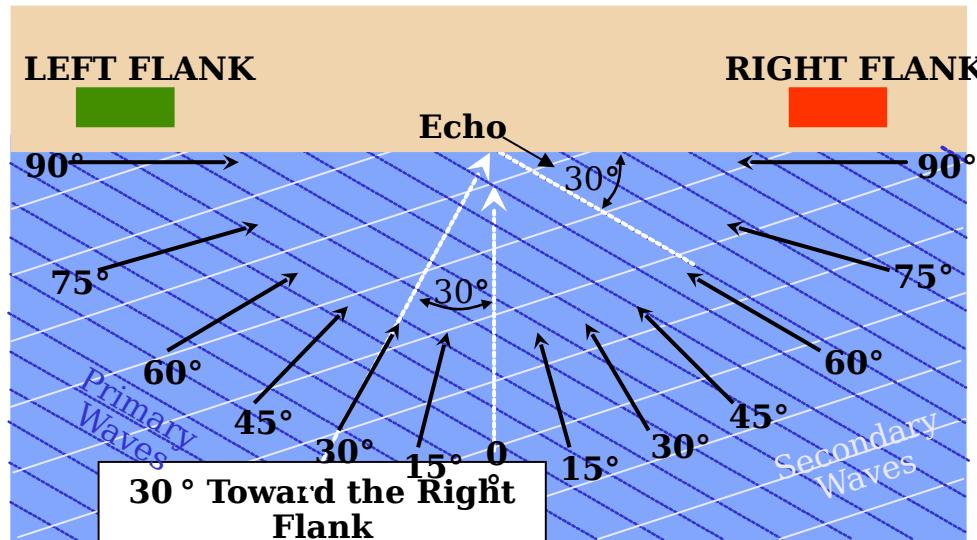
Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF TO LINE IN FT

Surf Zone. Predominant number of breakers in , and width of.

HOTEL _____



Breaker Types, Angle With Beach

D. The total number of spilling, plunging, and/or surging waves is recorded. The *percentage* of each is then reported as element DELTA.

E. The **Breaker Angle** is the angle the breaker makes with the beach, as seen from a landing craft's perspective. Recorded as moving **toward** either the right or left flank (see diagram lower left).

- This value is recorded in degrees and reported as element ECHO.
- Multiple wave trains (e.g., sea waves from one direction, swell from another) are recorded as necessary. *Primary* waves are reported as element ECHO, *secondary* waves are reported in section HOTEL (height, period, angle breakers make with beach).

Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT _____

Significant breaker=avg of highest 1/3 to nearest 1/2 foot.

BRAVO PT _____

Max breaker=nearest 1/2 foot

CHARLIE PT _____

Breaker period=nearest 5/10 of a second

DELTA PLUNGING SPILLING SURGING

breaker type=percentage applicable

ECHO TOWARD FLANK

Breaker angle=acute angle that breaker makes with beach.

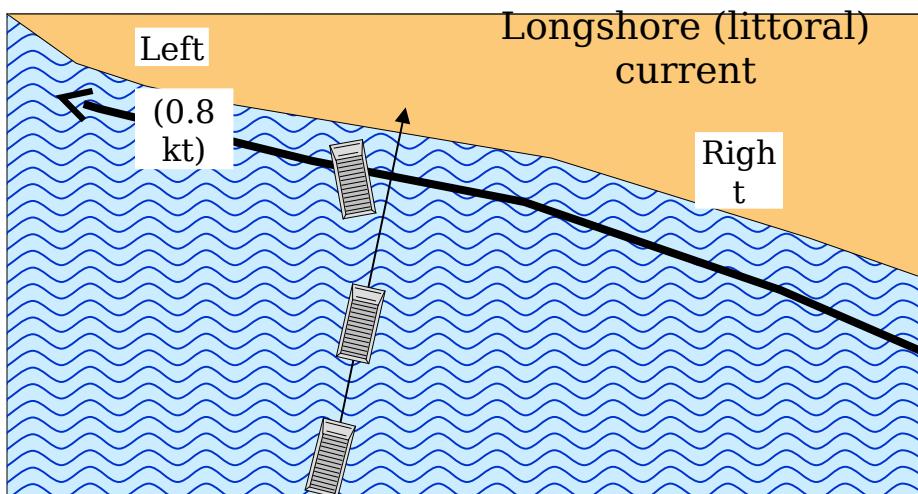
(F) **FOXTROT 0 PT 8 KT TOWARD L FLANK**
Littoral current = measured to nearest 1/10 of a knot.
Note 1 KT = 100 ft per minute

GOLF TO LINE IN FT

Surf Zone. Predominant number of breakers in , and width of.

HOTEL _____

Pertinent remarks = Wind, weather, visibility, secondary wave systems, etc.



Littoral Current

F. Littoral (longshore) currents are measured by throwing a piece of wood / other debris into the surf, immediately in front of the innermost breaker. The distance traveled in 1 minute is then measured.

- Each 10 feet traveled in the minute is equal to 0.1 kt of current. (30 feet traveled in 1 min = 0.3 kts current).

- The direction towards which the current is moving is called the **set**. (e.g., right/left flank of the beach)

- Information is reported in knots to the nearest 0.1, and recorded as element FOXTROT.

- Decreasing wave period or increasing wave height increases the littoral current.

(Example at left: 0.8 kt current toward the left flank)

Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT _____

Significant breaker = avg of highest 1/3 to nearest 1/2 foot.

BRAVO PT _____

Max breaker = nearest 1/2 foot

CHARLIE PT _____

Breaker period = nearest 5/10 of a second

DELTA PLUNGING SPILLING SURGING

breaker type = percentage applicable

ECHO TOWARD FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT PT KT TOWARD FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

⑥ **GOLF TO LINE IN FT**
Surf Zone. Predominant number of breakers in, and width of, the surf zone.

HOTEL _____

Pertinent remarks = Wind, weather, visibility, secondary wave systems, etc.

WAVE HEIGHT COMPUTATIONS
FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

____ X _____ = _____
____ X _____ = _____

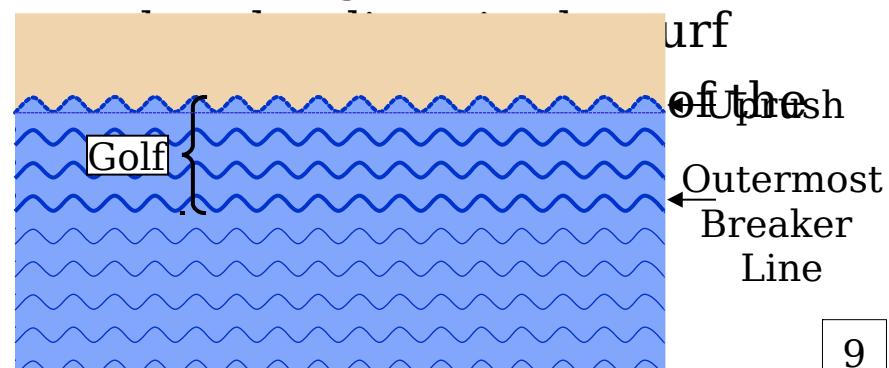
TOTAL = _____ = _____ ALFA
33

Surf Zone

- When approaching a beach, a wave will break when water depth is 1.3 times the wave height. Over sandbars, it is 1.7 times. This is the outermost limit and depth of the surf zone.

The surf zone is the area extending from the outermost breaker line to the limit of the uprush on the beach. GOLF is determined by:

- Counting the number of breakers in the surf



Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT _____

Significant breaker = avg of highest 1/3 to nearest 1/2 foot.

BRAVO PT _____

Max breaker = nearest 1/2 foot

CHARLIE PT _____

Breaker period = nearest 5/10 of a second

DELTA PLUNGING SPILLING SURGING

breaker type = percentage applicable

ECHO TOWARD FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT PT KT TOWARD FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF TO LINE IN FT

Surf Zone. Predominant number of breakers in, and width of.

HOTEL _____

Pertinent remarks = Wind, weather, visibility, secondary wave systems, etc.

WAVE HEIGHT COMPUTATIONS
FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

____ X _____ = _____

TOTAL = _____ = _____ ALFA
33

Additional Remarks

H. Any significant factors that might influence boat ops are recorded as element HOTEL:

- **Relative** wind speed/direction (measured the same way as element ECHO, noted as on- or off-shore)

“REL WIND 045° 15 kts R FLANK
ONSHORE”

Weather (element and location relative to beach)

“THUNDERSTORM 5 MILES SE”

- Visibility (estimated in miles, with obstructions to vision reported as applicable)

“VSBY SEAWARD 2 MILES
FOG, VSBY INLAND UNRESTR”

Surf Observation Report

SUROB NO _____

BEACH _____

DATE/TIME _____

ALFA PT _____

Significant breaker = avg of highest 1/3 to nearest 1/2 foot.

BRAVO PT _____

Max breaker = nearest 1/2 foot

CHARLIE PT _____

Breaker period = nearest 5/10 of a second

DELTA PLUNGING SPILLING SURGING

breaker type = percentage applicable

ECHO TOWARD FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT PT KT TOWARD FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF TO LINE IN FT

Surf Zone. Predominant number of breakers in, and width of.

HOTEL _____

**Pertinent remarks = Wind, weather, visibility, secondary
wave systems, etc.**

WAVE HEIGHT COMPUTATIONS
FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

____ X _____ = _____

TOTAL = _____ = _____ ALFA
33

Additional Remarks

- Rip currents (location related to centerline, right/left flanks, width)

“RIP CURRENT CHANNEL
LEFT FLANK RED 30 YDS
WIDE”

- Secondary waves (report height, period, and angle breakers make to beach)

“SECONDARY WAVES ALFA
2 PT O BRAVO 3 PT 0
CHARLIE 5 PT 0 ECHO 20
TOWARD RIGHT FLANK”

- Other possible remarks:
 - Debris in the surf zone
 - Presence of exposed/submerged bars

Surf Observation Report

SUROB NO ONEBEACH BLUEDATE/TIME 19 OCTOBER / 1200ALFA 4 PT 0

Significant breaker = avg of highest 1/3 to nearest 1/2 foot.

BRAVO 5 PT 5

Max breaker = nearest 1/2 foot

CHARLIE 7 PT 5

Breaker period = nearest 5/10 of a second

DELTA 5 PLUNGING 95 SPILLING 5 SURGING

breaker type = percentage applicable

ECHO 45 TOWARD L FLANK

Breaker angle = acute angle that breaker makes with beach.

FOXTROT 0 PT 8 KT TOWARD L FLANK

Littoral current = measured to nearest 1/10 of a knot.

Note 1 KT = 100 ft per minute

GOLF 3 TO 4 LINE IN 300 FT

Surf Zone. Predominant number of breakers in , and width

HOTEL RELATIVE WIND 045 / 15 KTSVISIBILITY 10 MILESPertinent remarks = Wind, weather, visibility, secondary
wave systems, etc.

WAVE HEIGHT COMPUTATIONS

FOR HIGHEST 33 WAVES

HEIGHT OCCURRENCE PRODUCT

5.5 X 1 = 5.55.0 X 4 = 20.04.5 X 9 = 40.54.0 X 15 = 60.03.5 X 4 = 14.0TOTAL = 140 = 4.24 ALFA